

Claims

[c1] 1. A solder ball fabricating process for producing at least one solder ball on a wafer, the method comprising:
forming a structured layer over the wafer, wherein the structure layer includes at least an under-ball-metallurgy layer being exposed;
forming a first patterned solder mask layer over the structured layer, wherein the first patterned solder mask layer has at least a first opening that exposes the under-ball-metallurgy layer;
depositing a first solder material into the first opening;
conducting a first reflow process so that the first solder material melts to form a pre-solder body over the under-ball-metallurgy layer;
forming a second patterned solder mask layer over the first patterned solder mask layer, wherein the second patterned solder mask layer has at least one second opening corresponding to the first opening to expose the pre-solder body and the second opening is larger than the first opening in an opening size;
depositing a second solder material into the second opening;
conducting a second reflow process so that the pre-

solder body and the second solder material melt and fuse together to form a solder ball over the under-ball-metallurgy layer; and
removing the first solder mask layer and the second solder mask layer.

- [c2] 2. The process of claim 1, wherein the first solder material and the second solder material are identical.
- [c3] 3. The process of claim 1, wherein the first solder material is different from the second solder material.
- [c4] 4. The process of claim 1, wherein the first solder material has a melting point higher than that of the second solder material.
- [c5] 5. The process of claim 1, wherein the solder ball is a lead-containing solder ball.
- [c6] 6. The process of claim 1, wherein the solder ball is a lead-free solder ball.
- [c7] 7. The process of claim 1, wherein the first patterned solder mask layer includes a photoresist layer.
- [c8] 8. The process of claim 1, wherein the first patterned solder mask layer includes a dry film.
- [c9] 9. The process of claim 1, wherein the step of forming

the second patterned solder mask layer includes laminating a mask layer over the first patterned solder mask layer and then patterning the second solder mask layer.

- [c10] 10. The process of claim 1, wherein the step of forming the second patterned solder mask layer includes spin-coating a mask layer over the first patterned solder mask layer and then patterning the second solder mask layer.
- [c11] 11. The process of claim 1, wherein the first solder material is a solder powder or a solder paste.
- [c12] 12. The process of claim 1, wherein the second solder material is a solder powder or a solder paste.
- [c13] 13. The process of claim 1, wherein the step of forming the structured layer comprises forming a redistribution layer to redistribute a bond pad of a chip to the under-ball-metallurgy layer.
- [c14] 14. The process of claim 1, wherein the under-ball-metallurgy layer is disposed and electrically connected to a bond pad of a chip.
- [c15] 15. A solder ball fabricating process for producing at least one solder ball on a wafer, the method comprising: forming a structured layer over the wafer, wherein the structure layer includes at least an under-

ball-metallurgy layer being exposed;
forming a first patterned solder mask layer over the structured layer, wherein the first patterned solder mask layer has at least a first opening that exposes the under-ball-metallurgy layer;
forming a second patterned solder mask layer over the first patterned solder mask layer, wherein the second patterned solder mask layer has at least one second opening corresponding to the first opening and the second opening is larger than the first opening in opening size;
depositing a first solder material into the first opening;
depositing a second solder material into the second opening;
conducting a reflow process on the foregoing solder materials within the foregoing openings to form a solder ball over the under-ball-metallurgy layer; and
removing the foregoing solder mask layers.

- [c16] 16. The process of claim 15, wherein before the step of forming the second patterned solder mask layer, the step of depositing the first solder material into the first opening is performed and a pre-reflow process is performed on the first solder material.
- [c17] 17. The process of claim 15, wherein the step of forming the structured layer comprises forming a redistribution

layer to redistribute a bond pad of a chip to the under-ball-metallurgy layer.

- [c18] 18. The process of claim 15, wherein the under-ball-metallurgy layer is disposed and electrically connected to a bond pad of a chip.
- [c19] 19. The process of claim 15, wherein the first solder material is different from the second solder material.
- [c20] 20. The process of claim 15, before the step of conducting the reflow process, further comprising:
 - forming a third patterned solder mask layer with a third opening over the second patterned solder masks, wherein the third opening is aligned to the second opening and is larger in open size than the second opening;
 - and
 - depositing a third solder material into the third opening.